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Group Art Unit: 2833

Remarks/Arguments

Claims 1-64 are pending in the application. No claims are amended by this response. Reconsideration and reexamination of the claims is requested in light of the below remarks.

Claims 1-9, 12-14, 16-22, 25-31, 34-40, 43-50, 53-60, 63 and 64 are rejected under 35 USC 112, second paragraph as being indefinite. The rejection is traversed.

The basis for the indefiniteness rejection is stated as, "The claims are indefinite since it is unclear of the range in line speeds for determining the gap." The Office Action then relates the asserted basis for indefiniteness to one of ordinary skill in the art, "The claims are not definite for one skilled in the art to determine what the subject matter is claimed, in this case the line speed since it is necessary to determine the gap which is also not specified."

A plain reading of the reason for the indefiniteness rejection makes clear that the basis for the rejection is that the line speed is not bounded, but left open-ended. This position is bolstered in that the claims containing an upper limit on the line speed (Claims 10, 15, 23, 32, 41, 51, 61) were not rejected for indefiniteness. Thus, the sole basis for the indefiniteness rejection is that the line speed is not bounded.

The indefiniteness rejection as stated in the Office Action is not tenable as it misapplies the applicable case law. The Federal Circuit has very clearly set forth a standard for determining the indefiniteness of a claim:

"In determining whether the claim is sufficiently definite, we must analyze whether 'one skilled in the art would understand the bounds of the claim when read in light of the specification.'" *Allen Eng'g Corp. v. Bartell Indus.*, 299 F.3d 1336, at 1348 (Fed. Cir. 2002), citing *Personalized Media Communs, L.L.C. v. ITC*, 161 F.3d 696, at 705 (Fed. Cir.1998).

Therefore, for the claims in the pending application, the basis for determining indefiniteness of the claims is whether one skilled in the art would understand the bounds of the claims in light of the specification and not whether the line speed is bounded. When the rejected claims are viewed in light of the specification, it is clear that the bounds of the claims are understood by one skilled in the art and by any reader of the specification for that matter.

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Using claim 1 as an example, the language at issue is:

“wherein the difference between the second radial distance and the first radial distance comprises a gap, the size of the gap being determined by the ratio of the gap (in units of millimeters) to the line speed (in units of millimeters per second) and the ratio ranges from 0.001 to 0.020 second.”

This claim element limits the gap size and defines the bounds of the gap size in terms of a mathematical equation and there is no ambiguity in the variable terms used in this claim element or the equation itself.

The gap is defined in the claim element as being the difference between the second radial distance and the first radial distance. The first and second radial distances are defined in the claims as the distance from the longitudinal axis of the die to the die opening and the choke ring, respectfully. The specification discloses in the drawings and describes in the text the first and second radial distances as r_c and r_d , respectfully. (See Fig. 2 and the related description). The gap is thus defined as the difference between r_c and r_d , which can be mathematically represented as the equation $\text{Gap} = r_c - r_d$. There is no ambiguity here.

There is also no ambiguity in the term line speed. The term line speed is well known to one of ordinary skill in the art and is fully described in the specification. The line speed is the speed at which the foam is drawn away from the die outlet by the downstream equipment in a typical foam extrusion line. (See paragraphs 41, 50, and 52 of the specification). The term line speed is defined in the specification as “the mean line speed of downstream equipment”. (See paragraphs 50 and 52 of the specification).

The claimed size of the gap is determined as the ratio of the gap (in units of millimeters) to the line speed (in units of millimeters per second), with the claimed ratio falling within the range of 0.001 to 0.020 seconds. A ratio is a well known mathematical equation, which for purposes of the claim would be the Gap divided by the Line Speed (L) or Gap/L , which results in the following equation when substituting the radial distances for the gap and setting the equation equal to the claimed range:

$$(r_c - r_d)/L = 0.001 \text{ to } 0.020$$

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There is no ambiguity in the equation. The variables of the equation are unambiguously described and/or defined in the specification. The equation represented by the claim is also unambiguous. One of ordinary skill in the relevant art easily understands the bounds of the equation. The equation covers any combination of r_c , r_d , and L that when put into the equation with the claimed units results in a ratio within 0.001 to 0.020 seconds. In fact, any person with basic Algebra skills will understand the bounds of this element.

That there is no upper limit on the line speed does not render the claim indefinite as the claim is unambiguously bounded by requiring the ratio to fall within the claimed range of 0.001 to 0.020. The lack of an upper limit on the line speed is not relevant in this case to determining the indefiniteness of the claim. When one applies the Federal Circuit's standard of definiteness to the claims, the claims are, on their face, definite as the gap size is bounded by the range limitations on the claimed ratio. To assert that the claims are indefinite because the line speed is not bounded incorrectly applies the relevant legal standard.

The logic of the analysis for claim 1 applies equally as well to the other rejected claims. They are all bounded in such a way that one of ordinary skill in the art can fully understand the bounds of the claim. Independent claim 1, like claim 53, defines the gap in terms of a ratio as claim 1 and is unambiguous for the same reasons as stated for claim 1.

Independent claims 25 and 34 define the gap in terms of the dimension between r_c , r_d . In other words, the claimed gap as defined in claims 25 and 34 can be represented by the equation $\text{Gap} = r_c - r_d$, or when using the upper limit in the claims $r_c - r_d < 4.57$. This gap size is clearly bounded and one of ordinary skill in the art can easily understand the bounds of the claim.

In fact, it is not clear why claims 25 and 34 and their dependent claims were rejected because there is no limit on the line speed since these claims are not dependent on the line speed. Claims 25 and 34 are completely independent of the line speed. No element of claims 25 and 34 is dependent on the line speed. The gap size of claims 25 and 34 is a physical dimension that can be measured by a ruler. As such, these claims are definite on their face. It is respectfully submitted that an error was made in rejecting claims 25 and 34 and the corresponding dependent claims as being indefinite for not having any line speed limitations.

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Independent claims 17 and 43 define the gap size in terms of the contact time, which as described in the specification is the time it takes for the foam leaving the die opening to contact the choke ring. This is an easily measurable characteristic. One can monitor an element of the foam as it leaves the die opening and time the amount of time it takes for that element to contact the choke ring. If that time is between 1.0 and 20.0 milliseconds, then the gap falls within this element of claims 17 and 43. The use of the contact time to define the gap size is not indefinite. In fact, it is very definite and can easily be measured. One of ordinary skill in the art can easily understand the bounds of these claims.

Like claims 25 and 34, no element of claims 17 and 43 expressly calls for a line speed. It is respectfully submitted that an error was made in rejecting claims 17 and 43 and the corresponding dependent claims as being indefinite for not having any line speed limitations.

Claims 1-9, 12-14, 16-22, 25-31, 34-40, 43-50, 53-60, 63 and 64 are all unambiguous and are definite. One of ordinary skill in the art, in fact, one with a basic understanding of Algebra, can easily understand the bounds of these claims when viewed in the context of the specification. The rejection of these claims as being indefinite is not tenable. It is respectfully requested that the rejection be withdrawn.

Claims 1-64 stand rejected as being obvious in view of US 5,622,732 to Beckwith. The rejection is traversed.

Beckwith '732 discloses an extrusion die 10 comprising an interior extrusion passageway 18 upstream of and leading to a die outlet 16. The passageway 18 is located within the interior of the die 10 and is supplied extrudate from an extrusion passageway 20 via a portion of the passageway described as a choke gap 22. The passageways 18 and 20 are generally horizontal where they are connected by the angled choke gap 22 passageway.

An annular choke ring 30 is internally positioned within the die lip assembly 19 and is capable of axial movement relative to the die lip assembly 19. As best seen in Fig. 4, the axial movement of the choke ring 30 moves the shoulder 27 of the choke ring 30 within the choke gap 22 to control the size of a restricted flow area 25 and thereby control the flow of extrudate through the die. "This flow control enables the user to reduce any spider marks on the finished

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foam material caused by the spider legs 26 at the inlet of the extrusion die apparatus, and also allows for better control of the pressure drop within the choke gap passageway by controlling the flow and distribution of the thermoplastic material." (Col. 5, lines 47-54).

All of the claims of the current application define a die and choke ring structure that is novel in view of Beckwith. The claimed invention defines a choke ring that is located downstream of and external to the die opening. Beckwith discloses a choke ring that is located within the interior of the extruder and upstream of the die.

While the claims do not expressly state the choke ring is located exteriorly of the die opening and downstream of the die opening, the claimed structure and supporting specification leads to no other conclusion. For example, all of the claims state that the "annular die opening is received within the choke ring opening." This structure clearly places the choke ring external of and downstream of the die opening and is not shown in Beckwith.

In the claims where the gap size is defined in terms of the ratio or the contact time, the claim language defines that the choke ring must be downstream of the die opening, otherwise the positive values recited for the ratio ranges and the contact times would not be possible.

If need be, Applicants are willing to amend the claims to make clear that the choke ring is external of and downstream of the die opening. However, it is respectfully submitted that this structure is already claimed by the described relationship between the claim elements and no amendment is warranted.

The choke ring of the claimed invention and that of Beckwith perform totally different functions. Applicants' claimed choke ring conditions the foam as it exits the die opening to control the corrugation of the foam. Beckwith controls the rate at which foam is delivered from the extrusion die. Beckwith does not in any way condition the foam after it has left the extrusion die.

Therefore, the claimed invention of a choke ring located externally of and downstream of the extrusion die to condition the foam after it has left the die opening is not obvious in view of the Beckwith choke ring located within the interior of the die and upstream of the die opening to control the flow rate to the die opening.

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It is respectfully submitted that claims 1-64 are novel and patentable over Beckwith.
Given that the claims are definite, it is respectfully submitted that the claims are in
condition for allowance.

If there are any questions, please contact the undersigned attorney.

Respectfully submitted,

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